



## NUTRITION STATUS AND NUTRIENT INTAKE OF DENOVO NAFLD PATIENTS

K. Vasundhara  
Padma

R.D., M.SC., P.G. Diploma In Nutrition And Dietetics

Dr. Gowri Sankar\*

Pharm., Ph.D., FIC.\*Corresponding Author

### ABSTRACT

Non-alcoholic fatty liver disease (NAFLD) is one type of fatty liver which occurs when fat is deposited (steatosis) in the liver. It is a common and potential serious complication in the patient, who does not abuse or consume little to no alcohol. Non-alcoholic steatohepatitis (NASH) is the most extreme form of NAFLD. It is related to insulin resistance and the metabolic syndrome and may respond to treatment originally developed for other insulin-resistant states (e.g.: Diabetes mellitus type2) such as weight loss, metformin, and thiazolidinediones. It is marked by liver inflammation, which might progress to scarring and irreversible damage. This damage is similar to the damage caused by heavy alcohol use.

### KEYWORDS :

#### INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) consists of fat accumulation in the liver (hepatic steatosis) and affects about 1.8 billion people. NAFLD can progress towards non-alcoholic steato-hepatitis (NASH), which is a more severe condition characterized by necro-inflammation with or without fibrosis. This can ultimately lead to cirrhosis and hepatocellular carcinoma (HCC). In addition, the related cardiovascular risk cannot be underestimated. To note, NAFLD is considered the hepatic manifestation of the metabolic syndrome, which is mainly characterized by obesity, dyslipidemia, insulin resistance, hypertension, and type 2 diabetes. In particular, in asymptomatic morbidly obese patients, there is a very high prevalence of approximately 90% of NAFLD (Adams LA, Angulo Pet, al 2006)

Non-alcoholic fatty liver disease (NAFLD) encompasses a spectrum ranging from simple steatosis to non-alcoholic steatohepatitis, which causes an increased risk of cirrhosis, type 2 diabetes, and cardiovascular complications. With the worldwide growing incidence of obesity, sedentary lifestyle, and unhealthy dietary pattern, NAFLD has currently been recognized as a major health burden. Dietary patterns and nutrients are the important contributors to the development, progression, and treatment of NAFLD and associated metabolic co morbidities.

Generally, hyper caloric diet, especially rich in trans/saturated fat and cholesterol, and fructose-sweetened beverages seem to increase visceral adiposity and stimulate hepatic lipid accumulation and progression into non-alcoholic steatohepatitis, whereas reducing caloric intake, increasing soy protein and whey consumption, and supplement of monounsaturated fatty acids, omega-3 fatty acids, and probiotics have preventive and therapeutic effects. In addition, choline, fiber, coffee, green tea, and light alcohol drinking might be protective factors for NAFLD. Currently, NAFLD/NASH is the most common cause of liver disease worldwide and the third most common indication for liver transplantation in North America.1 The management of patients with NAFLD consists of treating steatohepatitis and the associated metabolic co morbidities (Jian-Gao Fan et, al 2000)

#### METHODOLOGY

100 samples were diagnosed denovo NAFLD were recruited as subjects in this study. Questionnaire method was used to collect data regarding General information such as gender, age, income, family size, education, region, anthropometry, water consumption, past medical history of non-communicable problems, physical activity status, stress status etc.,

Thereafter, the condition of the subjects was assessed for every 3 months and 6 months. The end results were evaluated, analyzed and maintained. Dietary intakes were assessed using 24hr recall method, Frequency of food consumption. The amounts consumed were recorded in house hold units by measuring with a ruler, katori and measuring cups. Records were validated according to corresponding food table and nutrient data base, nutritional values. Physical activity was assessed using 7-Day Physical activity diary.

Participants were instructed to document all activities for 7 consecutive days. After every 3 months and 6 months the absolute minutes spent on various physical activities were calculated for each participant. Statistical analysis was completed and graphs were produced and obtained p-values and Chi-square significance for majority of variables.

#### RESULTS AND DISCUSSION

##### TOTAL SUBJECT

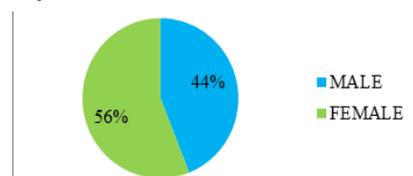


Fig.1. Distribution of subjects based on gender

It is evident from Fig.1 that the majority of the subjects in the present study are females compared to the female population. About 56 % of female case studies are said to be having NAFLD when compared to the 44% of male case studies. Nonalcoholic fatty liver disease (NAFLD) has been recognized as a major health burden. Estimates suggest that about 20–30% of adults in developed countries have excess fat accumulation in the liver [Propst et al. 1995; Bellentani et al. 2000; Falck-Ytter et al. 2001; Bedogni and Bellentani, 2004; Zelber-Sagi et al. 2006], 50% among people with diabetes and about 80% in obese and morbidly obese people [Bellentani et al. 2000; Del Gaudio et al. 2002; Gupte et al. 2004]

##### AGE GROUP

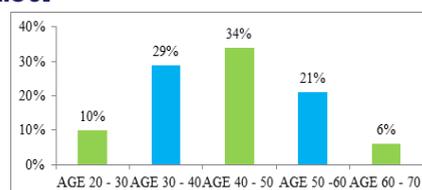


Fig.2. Age group of the subjects

Fig.2 shows that the majority of the subjects are between 40years to 50years of age.

**BODY MASS INDEX**

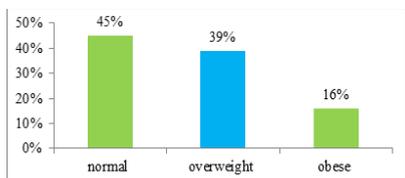


Fig.3. Classification of subjects based on BMI

BMI was calculated as per their height and weight. Fig.3 shows majority of them are normal, only 39% of them are overweight and 16% of them are obese.

**PHYSICAL ACTIVITY**

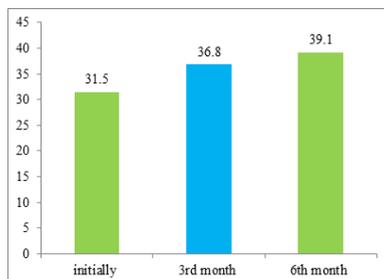


Fig.5. The total mean of physical activity done by the NAFLD subjects

The above figure shows the evident that there is a gradual increase in the physical activity like walking and running. Initially it was 31% and after an intervention in their diet and life style, NAFLD subjects are having an increase in their physical activity.

TABLE.1. MACRO NUTRIENTS INTAKE OF DENOVO NAFLD PATIENTS

DATA	N	ENERGY	CARBOHYDRATES	PROTEIN	FAT
INITIALLY	100	2626.5 ± 291.9	427.8 ± 46.8	64.4 ± 10.8	71.7 ± 12.3
3 <sup>RD</sup> MONTH	100	1550.5 ± 74.0	251.9 ± 12.0	56.5 ± 7.19	34.6 ± 1.8
6 <sup>TH</sup> MONTH	100	1406.5 ± 22.08	210.8 ± 2.9	70.2 ± 0.9	31.2 ± 0.4

**ENERGY**

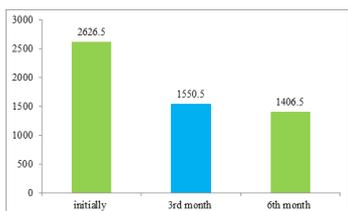


Fig.6. Energy (kcal/d) intakes of NAFLD patients

**PROTEIN**

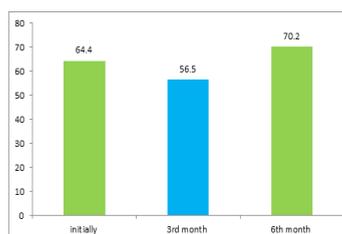


Fig.8. Protein (kcal/d) intakes of NAFLD patients FAT

**CARBOHYDRATES**

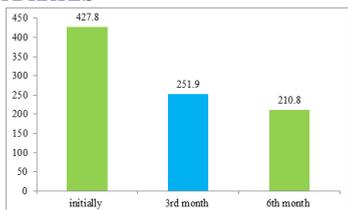


Fig.7. Carbohydrates (kcal/d) intakes of NAFLD patients

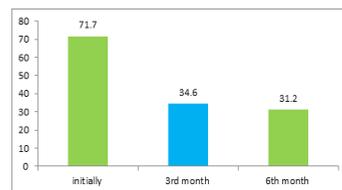


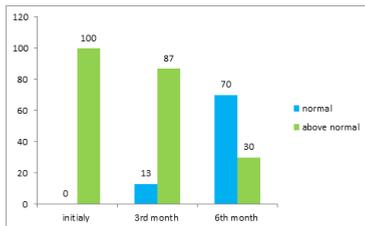
Fig.9. Fat (kcal/d) intakes of NAFLD patients

TABLE.2. CLINICAL PARAMETERS OF THE NAFLD PATIENTS

	RANGE	CLINICAL PARAMETERS				
		BLOOD SUGARS (%)	HTN+ (%)	LFT (%)	FATTY LIVER (%)	HYPERPIDEMIA (%)
INITIALLY	NORMAL	81	86	92	0	88
	ABOVE NORMAL	19	14	8	100	12
3 <sup>RD</sup> MONTH	NORMAL	91	96	98	13	95
	ABOVE NORMAL	9	4	2	87	5
6 <sup>TH</sup> MONTH	NORMAL	100	100	99	70	100
	ABOVE NORMAL	0	0	1	30	0

The above table.2. shows the clinical parameters of NAFLD patients . Initially the clinical parameters were high and in the 3<sup>rd</sup> month of intervention all the clinical parameters had slightly changed and improved. In the last intervention i.e. in the 6<sup>th</sup> month , the clinical parameters had been drastically changed when compared with the initial data. The results were highly satisfied.

## FATTY LIVER



**Fig.10. NAFLD patients with fatty liver normal and above normal**

Fig.10. the above graph explains the gradual change of the impression of fatty liver in the NAFLD patients, who are abnormal initially, with the help of diet intervention, frequent counselling on life style changes showed to normal levels. Perdomo et al explained about the impact of nutritional changes on NAFLD is a major global health threat due to its growing incidence and prevalence . Therapeutic approaches emphasise lifestyle modifications including physical activity, healthy eating habits that intend to control body weight and other factors. The purpose of this article is to assess the impact of dietary recommendations against NAFLD.

During the study it was observed that, there was high consumption of simple sugars from soft drinks, soda, sodapop, coca-cola etc., heavy intake of fructose from juices, jellies, jams, high fructose corn syrup (HFCS) based products, and caramel colorant among the subjects, which allivited the risk for liver steatosis. Studies have assumed that fructose can be linked to NAFLD through both indirect and direct mechanisms. Indirectly, fructose may lead to adverse metabolic effects which can increase the risk of developing NAFLD. Directly, fructose might cause hepato toxic damage such as that observed in hereditary fructose intolerance. The evaluated group presents a health risk situation considering the indicators of nutritional status. The regular diet of the subjects appeared to be rich in carbohydrates-simple sugars, fructose, high calories, high fat etc., which triggers risk for NAFLD.

## CONCLUSION

Counseling had a great impact on their life style, dietary modifications and physical activity level. Patients were further advised to avoid consumption of refined processed foods which are high in fat (trans fat) and low fiber content e.g. biscuits, cake, etc. Such foods are a source of empty calories and would worsen insulin resistance and may also promote weight gain.

## REFERENCES

- Adams LA, Angulo P (2006). "Treatment of No-Alcoholic Fatty Liver Disease". Post-graduation Medical Journal-82, (Page no: 315-22).
- Bellentani S, Saccoccio G, Masutti F, Prevalence and risk factors for Hepatic steatosis in Northern Italy, Annual International Medical Journal 2000, 132: (Page no: 112-117).
- Carolina M perdomo, gema fruhbeck and javier escalada impact of nutritional changes on NAFLD. March-2019.
- Chalasani N. et al. The diagnosis and management of fatty liver disease: Practise guideline by the American Gastroenterological Association, American Association for the study of Liver diseases, and American College of Gastroenterology. 2012; (Page no: 1592-1609).
- Clark JM, Diehl AM (2003), "Non-alcoholic fatty liver disease: an under-recognized cause of cryptogenic cirrhosis". JAMA, 289 (22).
- Gupta P, Amarapurkar D, Agal S, et al. Non-alcoholic steatohepatitis in type 2 diabetes mellitus. Journal of Gastroenterology Hepatology, 2004, (Page no:

854-858).

- Non-Alcoholic Fatty Liver Disease and Nutritional Implications: Special Focus on Copper Laura Antonucci, l Cristiana Porcu,
- Rinella ME (June 2015), "Non-alcoholic Fatty Liver Disease: A systematic review". JAMA, (226-373).
- Role of diet and nutritional management in non-alcoholic fatty liver disease Jian-Gao Fan, Hai-Xia Cao
- Sanjay Kalra, Manoj Vithalini, Gurjeet Gulati, Brahmananda Das. Original Article study of Prevalence of Non-alcoholic Fatty Liver Disease (NAFLD) in Type 2 Diabetes patients in India. Journal of Association of Physicians of India. July-2013, Vol-61.